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The Diminishing Burden of Orphanhood A Great Social Benefit

THE sorriest victims of the premature death of adults are the children who thereby become orphaned of father or mother or both. And, conversely, one of the greatest boons resulting from the modern improvement in mortality is the saving of innumerable children from the fate of orphanhood. Just what this means to the present and future generations can best be realized by a computation which contrasts the number of orphans that result from the mortality prevailing at the present time, with the corresponding number that would have resulted under the mortality conditions at the beginning of the present century.

The conclusions from such computations are striking. The mortality rates prevailing in 1930, if applied to the parents of children living in that year, would have produced, among the white population of the United States, about 3,085,000 children under age seventeen who had lost one or both parents. Of these, about 1,739,000 would have been fatherless, about 1,168,000 would have been motherless and about 178,000 would have been completely orphaned of both parents. If, on the contrary, we apply to this population of 1930 the old mortality rates of 1901, we find that these would have produced, in the white population of 1930, about 5,202,000 orphans under age seventeen. Of these, about 2,726,000 would have been fatherless, about 1,931,000 would have been motherless, and about 545,000 would have been completely orphaned of both parents. Thus the improvement in mortality in the first thirty years of the current century would correspond to a total saving in 1930 of about 2,117,000 children under seventeen years of age from orphanhood, in the white population of the United States.

These outstanding results are summarized in Table I on page 3. Further details, also of much interest, are set forth in Table II, on page 4. From this latter, we note, first of all, that paternal orphans considerably outweigh maternal orphans. So, for example, at age sixteen, 18.27 per cent. of all children would, according to the mortality of 1901, be fatherless, and only 13.54 would be motherless, or, in round numbers, one in five would be father-

less and one in seven would be motherless. According to the mortality of 1930, one in eight children would be fatherless at age sixteen, and one in thirteen would be motherless. The excess of paternal orphans is due to two circumstances, namely, first that adult males are subject to somewhat higher mortality rates than females, at a given age; and second, that the father in the majority of cases is a few years older than the mother, and mortality, of course, increases with age.

How is the saving from orphanhood which we have noted distributed among children of different ages? This is an interesting question, because, when a child is orphaned early in life, this frequently means that its parents died relatively young. Now it is almost entirely below midlife that the modern improvement in mortality has taken place. We would, therefore, expect that the improvement in the chance of becoming orphaned would be greatest for very young children, and that it would become less and less marked as the child grows older. This is, indeed, the case, as we shall see by a further study of the figures in Table II. In this table, columns (2) and (3) show, for the mortality of 1901 and that of 1930, respectively, the percentage of children that would be orphans at each age from the first to the seventeenth year of life. For example, according to the mortality of 1901, 1.10 per cent. of children would be fatherless in the first year of life; according to the mortality of 1930, this figure would be exactly halved. This, of course, reflects the diminished mortality among men in the age period at which they are supporting a family of young children. Of the children age one last birthday, 1.99 per cent. would be fatherless, according to the mortality of 1901, but only 1.01, according to that of 1930; again a reduction to almost one-half. And so on, for successive years of life. The figures in these columns (2) and (3) increase as we go down the line, because the effect of orphanhood is cumulative; that is, the orphans among children five years old, for example, comprise those who lost their parent in their fifth year, their fourth year, their third, their second, and their first year of life, as well as those who were so very unfortunate as to have lost their mothers at birth.

While the figures in columns (2) and (3), being cumulative, indicate the per cent. of children who *are* orphans at each specified age, the differences between successive items in these columns indicate the proportion of children that *become* orphaned in a given year of age. So, for example, in the second* year of life, 1.99—1.10, or .89 per cent., of the children would lose their father according to the mortality of 1901. This figure is the first item in column (4). According to the mortality of 1930, the corresponding figure is .46, which appears as the first item in column (5) of the table. Here again, the lesser figure for 1930 reflects the

*To be quite exact, the figures relate to the age interval from one-half to one and one-half years.

smaller mortality among the parents of these children according to the conditions of 1930, as compared with those of 1901. The degree of reduction in this mortality among the parents is seen in the ratio of .46 to .89=.52, which is tabulated in the last column. Now the figures in this column (6) exhibit an interesting feature. They run in a continuously increasing sequence from .52 to .76, in the case of paternal orphans, and from .49 to .68, in the case of maternal orphans. In other words, these ratios start at about 50 per cent., or one-half, and work up towards about three-quarters. It is here that the circumstance referred to above finds numerical expression. When a child is orphaned early in life, this frequently means that its parent died relatively young, and it is at the younger ages that modern mortality has made its chief gains over that of thirty years ago. At the older ages, such as correspond to the parents of children orphaned in their 'teens, the contrast between the mortality of 1901 and that of 1930 is much less marked, and the figures for a given age in columns (4) and (5) become more nearly equal, so that their ratio in column (6) increases.

The social implications of this changing aspect of the orphanhood situation can hardly be rated too highly. The children are the first and direct gainers, in being preserved from the physical and spiritual handicap of a youth deprived of parental affection and guidance. But society as a whole also reaps an important and sure gain. Not only is it relieved of the economic burden of caring for children whose natural support has been removed by death, but, without reflecting in any way upon the excellent institutional or private care that is nowadays bestowed upon many orphans, it can surely be said, without fear of contradiction, that this can never fully replace the

TABLE I

Saving in Orphans Under 17 Years of Age by Improvement in Mortality in 1930 Over 1901. United States White Population, 1930

CONDITION OF ORPHANHOOD	NUMBER OF ORPHANS ON BASIS OF MORTALITY AS OF		SAVING IN NUMBER OF ORPHANS BY IMPROVEMENT IN MORTALITY
	1901	1930	
Father alone dead.....	2,726,000	1,739,000	987,000
Mother alone dead.....	1,931,000	1,168,000	763,000
Both parents dead.....	545,000	178,000	367,000
TOTAL.....	5,202,000	3,085,000	2,117,000

TABLE II

Orphanhood at Successive Ages of Childhood. Influence of Changing Mortality of Parents According to Mortality of White Persons in the United States. 1901 and 1930 Compared

Age Last Birthday	Per Cent. Orphans, According to Mortality of		Increase in Per Cent. of Orphans per Year of Age, According to Mortality of		Ratio Col. (5) to Col. (4)
(1)	1901 (2)	1930 (3)	1901 (4)	1930 (5)	(6)
	Paternal Orphans				
0	1.10	.55	.....	.....	.....
1	1.99	1.01	.89	.46	.52
2	2.89	1.49	.90	.48	.53
3	3.83	1.99	.94	.50	.53
4	4.79	2.52	.96	.53	.55
5	5.75	3.07	.96	.55	.57
6	6.74	3.65	.99	.58	.59
7	7.76	4.27	1.02	.62	.61
8	8.81	4.92	1.05	.65	.62
9	9.89	5.61	1.08	.69	.64
10	10.98	6.34	1.09	.73	.67
11	12.11	7.10	1.13	.76	.67
12	13.28	7.91	1.17	.81	.69
13	14.47	8.77	1.19	.86	.72
14	15.69	9.66	1.22	.89	.73
15	16.96	10.61	1.27	.95	.75
16	18.27	11.61	1.31	1.00	.76
	Maternal Orphans				
0	.63	.45	.....	.....	.....
1	1.37	.81	.74	.36	.49
2	2.12	1.18	.75	.37	.49
3	2.89	1.56	.77	.38	.49
4	3.66	1.94	.77	.38	.49
5	4.44	2.33	.78	.39	.50
6	5.23	2.74	.79	.41	.52
7	6.02	3.15	.79	.41	.52
8	6.81	3.58	.79	.43	.54
9	7.61	4.02	.80	.44	.55
10	8.42	4.48	.81	.46	.57
11	9.25	4.96	.83	.48	.58
12	10.08	5.45	.83	.49	.59
13	10.93	5.97	.85	.52	.61
14	11.79	6.52	.86	.55	.64
15	12.66	7.09	.87	.57	.66
16	13.54	7.69	.88	.60	.68

influence for good of a well ordered home life. Problems of delinquency, or at least of indifferent citizenship, will surely be reduced as the proportion of orphans in the community decreases.

As mortality has improved almost continuously in past years, we may reasonably hope that the present very favorable condition may continue or even be surpassed in years to come. Children of the present and future generations will then reap the full benefit of the lower deathrates of their parents and the community will profit in lowered costs of custodial care and in a better trained and equipped group of citizens.

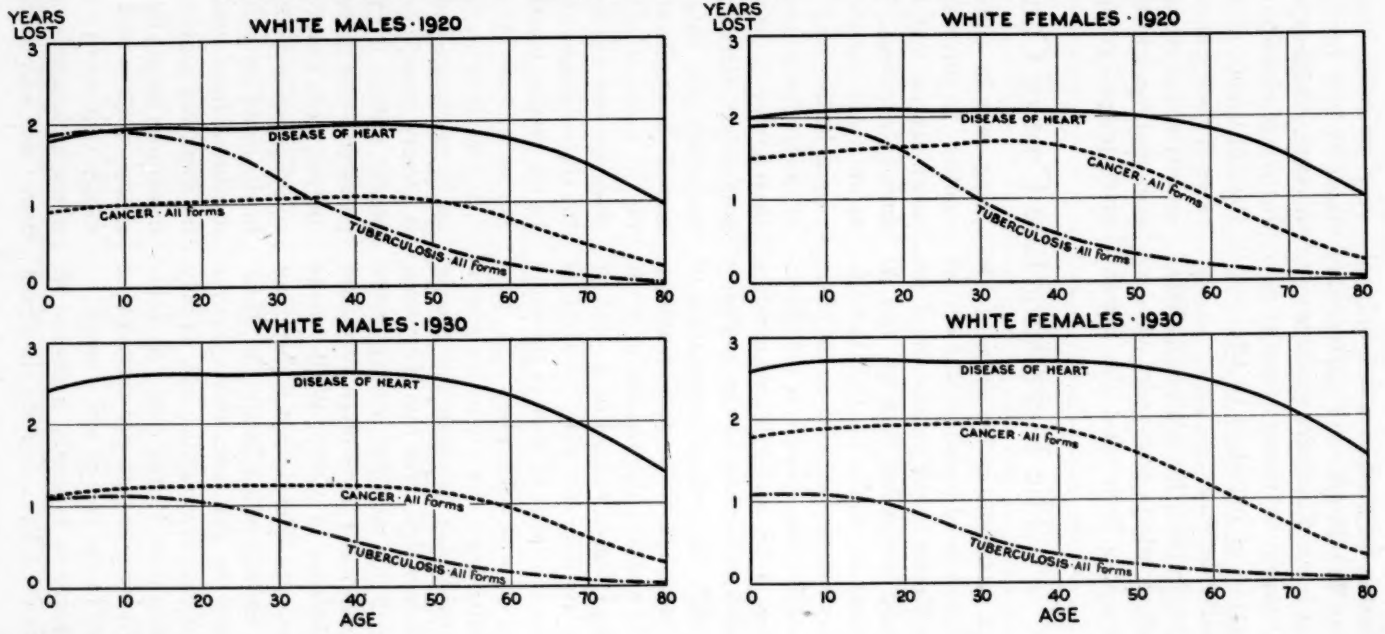
The Increasing Life Cost of Cancer

As measured in the years of life sacrificed to cancer, the cost of this disease to the population of the United States has gone up over 20 per cent. in the decade 1920 to 1930. This statement is based on the effect of deaths from cancer on the expectation of life at birth among white males. According to the mortality in 1920, the loss of expectation of life at birth from cancer among white males in the population of the United States was .93 of a year, or just less than one year. According to the mortality of 1930 in the same area, it was 1.12 years. It is a familiar fact that females pay a heavier death toll from this disease than do males. The loss of expectation of life at birth among white females was 1.50 years in 1920, and 1.79 years in 1930. While these figures are in each case higher than the corresponding figure for white males, the per cent. increase over the decade is somewhat less, namely a little over 19 per cent., as compared with the 20 per cent. noted above in the case of white males.

Cancer is typically a disease of advanced life, deaths therefrom being rare in children and young adults. In this respect it resembles heart disease and is quite distinct from tuberculosis. The loss of years of life from these diseases we discussed in the June and July issues of the Bulletin respectively. It is instructive to reproduce here, in somewhat different combination, and with the data for cancer inserted, the graphs showing the number of years of expectation of life that are lost through deaths from the three diseases at successive ages. In the graphs, based on the data for cancer set forth in the table on page 7, and on those previously published, for heart disease and tuberculosis, it is clearly seen how the curve for cancer follows a course essentially parallel to that of the curve for heart disease, while that from tuberculosis cuts diagonally across that for cancer in the chart for 1920. By 1930 the deathrate from tuberculosis had so far improved that the curve for this disease no longer intersects that for cancer, but lies well below it. This means, that even at the younger ages, where tuberculosis takes a relatively heavy toll, and cancer almost none,

YEARS OF LIFE LOST THROUGH CANCER, HEART DISEASE AND TUBERCULOSIS

United States Death Registration States of 1920, in 1920 and 1930.



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the latter disease eclipses the former in its effect upon the prospective number of years of after-lifetime. At the earlier date, 1920, tuberculosis still outweighed cancer in the ratio of two to one as regards the curtailment in the expectation of life at birth.

The curve for tuberculosis, both for 1920 and 1930, slants downward in the shape of an elongated inverted S, in characteristic contrast to the shape of the curves for heart disease and cancer, which run a rather flat course to about the 40th or 50th year of life, and then slope downward. These characteristic shapes reflect the fact that tuberculosis claims its victims for the most part in early life, while cancer and heart disease, high as is the mortality from them, cut off as a rule only a relatively short period from the ultimate attainable span of life. In this respect tuberculosis still holds today, among the causes of death, a sinister place that is not to be measured merely by the *number* of persons who become its victims. From the purely economic standpoint, cancer is still the lesser social burden. But even in this regard, the situation is changing in favor of tuberculosis.

Years of Life and Per Cent. of Remaining Years of Life Lost Through Cancer (All Forms). United States Death Registration States of 1920, in 1920 and 1930. White Persons, by Sex

Sex; Year	Age								
	0	12	22	32	42	52	62	72	82
	Years of Life Lost								
Males:									
1920	.93	1.01	1.04	1.07	1.08	.98	.74	.43	.17
1930	1.12	1.22	1.23	1.24	1.22	1.12	.88	.53	.23
Females:									
1920	1.50	1.60	1.64	1.70	1.62	1.33	.90	.48	.20
1930	1.79	1.90	1.93	1.94	1.82	1.49	1.04	.59	.25
	Per Cent. of Remaining Years of Life								
Males:									
1920	1.68	1.95	2.40	3.00	3.85	4.77	5.34	5.06	3.54
1930	1.89	2.29	2.77	3.46	4.42	5.59	6.52	6.37	4.80
Females:									
1920	2.61	3.04	3.71	4.62	5.57	6.21	6.20	5.38	3.94
1930	2.84	3.40	4.11	5.06	6.10	6.82	7.06	6.55	4.88

Contrasting Trends in Heart Disease*

THE heart disease situation today, serious as it is, has certain favorable aspects which merit attention. One of the most encouraging is the consistent and prolonged decline in the mortality from chronic valvular heart disease, a decline which has affected every age, both sexes, and negroes, as well as white persons. The rate of fall has been greatest among young persons, with current deathrates at ages under 25, barely half what they were in 1921-1922, and in the first decade of life approximately one-third their level of twelve years ago. Between ages 25 and 44, there has also been substantial improvement. Among men of these ages, the mortality from valvular disease has fallen about 20 per cent., and among women, over 25 per cent. The rate of fall at these ages has been slightly greater for negroes than for white persons. Even past 45 years of age, there has been extensive and steady improvement in the recorded mortality from these diseases of the heart. The rates have declined more than one-third among white persons and more than one-fifth among the colored.

The decline in deathrates from valvular heart disease is encouraging, because, up to age 50, chronic heart disease is chiefly of this type and results largely from bacterial invasion. The chief offenders are the organisms causing rheumatic fever, syphilis, and, to a less extent, the communicable diseases of childhood. The deathrates from all three have been steadily declining, and we may infer that this largely explains the fall in mortality from chronic disease of the heart valves, although no satisfactory statistical proof of this relationship has yet been furnished.

In marked contrast with these favorable trends is the increasing mortality from diseases of the heart muscle. Even among young persons, where chronic heart disease of this type is infrequent, there has been a slight rise. Between ages 25 and 44, the increases have been enormous. The rate for white men at these ages has doubled and that for white women has risen by nearly two-thirds. The rate for negro men has tripled and has almost doubled, for colored women. In middle life and old age, also, there have been large increases in rates for myocardial disease. Among white men between ages 45 and 74, deathrates from myocardial disease have doubled and among women have gone up by 75 per cent. Among colored persons in this period of life, current levels of myocardial deathrates are more than two and one-half times their level of twelve years ago.

Myocardial diseases are to a much lesser degree a result of infectious processes than are the valvular diseases. Consequently, the deathrate from these conditions can bene-

*This article summarizes part of a paper "Favorable Aspects of Heart Disease with Special Reference to the Health Officer," by Louis I. Dublin, Ph.D., and Donald B. Armstrong, M.D., to be presented before the annual meeting of the American Public Health Association, October 9, 1933.

fit little, if at all, from the conquest of diseases of bacterial origin. A large part of myocardial disease is an inevitable and natural process of advancing age, often hastened, it is true, by destruction of heart tissues as a result of infection. Senescent changes take place in practically every part of the body, but many of them are hardly more than symptomatic and have no effect on longevity, as, for example, the loss in keenness of vision or hearing, and the increased brittleness of the bones. In the heart, however, these changes are serious. On the one hand, they may limit the efficiency of the heart and result in its eventual failure. On the other, senescent changes, directly or indirectly, may result in injury to the muscle wall, as in infarction or thrombosis—types of accidents which, in the heart, are usually fatal, but in many other parts of the body often prove of little consequence.

From the point of view of control of heart disease, there is every reason to look forward to a continued improvement in the mortality from the valvular conditions. In contrast, little may be expected in the way of a reduction of deaths from the myocardial diseases. But this need give us little concern, for they result largely from the inevitable breakdown of the organism with advancing age, and as a greater proportion of persons is surviving today to higher ages, it necessarily follows that more will suffer from breakdowns of this type. The heart picture, therefore, on the whole, is far from discouraging.

Health Record for August, 1933

At the end of two-thirds of the current year, the deathrate among the many millions of Metropolitan Industrial policyholders was only 3 per cent. above the figure for the corresponding part of last year. This is indicative of a highly satisfactory health situation among this large body of people, for 1932 was the best health year of all time.

The record for the month of August is not so favorable. In fact, the recorded deathrate of 8.1 per 1,000 is higher than has obtained for any August since 1928. Appreciably higher mortality was observed during this year than last for cancer, cerebral hemorrhage, heart disease, pneumonia and chronic nephritis. Again, the Canadian record is better than that for the American policyholders, as the August deathrate in that country showed no increase over that registered last year.

The record for the principal controllable diseases in 1933, to date, has been particularly good. Each of the four principal communicable diseases of childhood has shown improvement over 1932. The rate for diphtheria has been cut almost to one-half the previous minimum. The cumulative figure for tuberculosis is only 68.3 per 100,000; and it may be safely predicted that, for the first time in the history of this Company's

Industrial policyholders, the tuberculosis deathrate at the end of the year will be found to have dropped below 70 per 100,000. The mortality from pneumonia, despite the large number of deaths registered during January and February, shows a year-to-date drop of more than 3 per cent. Here also the cumulative mortality rate is lower than ever before. Deaths from diarrheal complaints are almost certain to record a new minimum this year, inasmuch as the year-to-date figure is lower than ever registered for any corresponding period. Diseases arising out of pregnancy and childbirth have caused fewer deaths this year than in any previous one. One of the most noteworthy items on the favorable side is a decline of 4.6 per cent. in suicide.

The unfavorable aspects of the 1933 health record are those to which we have called attention in previous BULLETINS. Four months before the close of the year, no doubt remains but what 1933 will see new high points recorded in the deathrates for cancer, diabetes and heart disease.

The deathrate in the general population of the large cities of the United States for August was 9.5 per 100,000 estimated population, as compared with 9.7 in July and 9.3 in August, 1932. The diseases which showed increased incidence in August, as compared with July, were diphtheria, poliomyelitis and typhoid fever. Those for which fewer cases were reported were influenza, measles, scarlet fever and smallpox. Comparison with the facts for August of last year shows that there was more sickness in 1933, from poliomyelitis and scarlet fever, together with fewer cases of diphtheria, influenza, measles, smallpox and typhoid fever. The month was marked by a serious outbreak of encephalitis lethargica in St. Louis and its environs. Reports of poliomyelitis cases were almost three times as numerous for August as for July. The increase was most marked in New York, where there were 443 cases in August against 89 in July. Other states with increases were Massachusetts, New Jersey, Pennsylvania, Ohio, Illinois and Minnesota.

Although there was the usual seasonal increase in typhoid fever during August, the number of cases was not excessive for this time of the year and showed a considerable decline compared with last August.

The following items are of special public health interest. A new law became effective in Illinois on July 1st requiring the use of 1 per cent. solution of silver nitrate or some equally effective prophylactic in the eyes of all newborn infants. The solution is distributed without cost. The National Tuberculosis Association has recently begun a campaign to determine the causes for the high incidence of tuberculosis among negroes,with the hope that it will be found possible to lower the mortality from this disease. It is planned to concentrate first upon the study of conditions among negroes in the northern States.

The following table shows the mortality among Industrial policyholders for August, 1933; July, 1933, and August, 1932, together with the cumulative rates for the first eight months of each year.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates per 100,000 for Principal Causes. Weekly Premium-Paying Business in Industrial Department. All Ages (Annual Basis).*

MONTHS OF AUGUST, 1933; JULY, 1933, AND AUGUST, 1932

CAUSES OF DEATH	ANNUAL RATE PER 100,000 LIVES EXPOSED*				
	Aug. 1933	July 1933	Aug. 1932	Cumulative January-August	
				1933	1932
TOTAL—ALL CAUSES	814.5	741.2	769.1	900.0	873.5
Typhoid fever	3.4	2.2	2.5	1.3	1.4
Measles	.2	1.3	.5	2.0	2.3
Scarlet fever	.8	1.0	1.3	3.0	3.3
Whooping cough	2.8	2.5	3.1	2.4	3.5
Diphtheria	1.6	1.9	1.9	2.2	3.9
Influenza	3.4	3.2	3.9	25.9	20.7
Tuberculosis (All forms)	65.9	62.2	65.0	68.3	72.7
Tuberculosis of respiratory system	59.4	55.4	57.5	60.9	64.1
Cancer (All forms)	99.0	88.2	88.0	94.6	88.9
Diabetes mellitus	18.4	17.3	19.7	24.4	22.7
Cerebral hemorrhage; apoplexy	59.1	56.2	52.3	66.8	63.2
Diseases of heart†	145.0	132.5	134.0	170.0	158.2
Pneumonia (All forms)	32.9	27.4	28.5	68.7	71.0
Other respiratory diseases	7.3	7.1	7.5	10.3	9.7
Diarrhea and enteritis	16.0	12.4	17.6	9.6	9.8
Chronic nephritis (Bright's disease)	63.9	55.1	60.1	69.6	68.9
Puerperal state—total	9.5	7.4	10.2	10.0	10.7
Suicides	10.6	9.3	11.2	10.4	10.9
Homicides	5.7	6.0	6.6	6.1	6.0
Accidents—total	70.7	64.5	69.1	56.2	54.8
Automobile accidents	21.5	18.4	20.9	18.3	18.3
All other diseases and conditions	198.3	183.3	186.2	198.2	190.8

*The rates for 1933 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

†Excludes pericarditis, acute endocarditis, acute myocarditis and angina pectoris.

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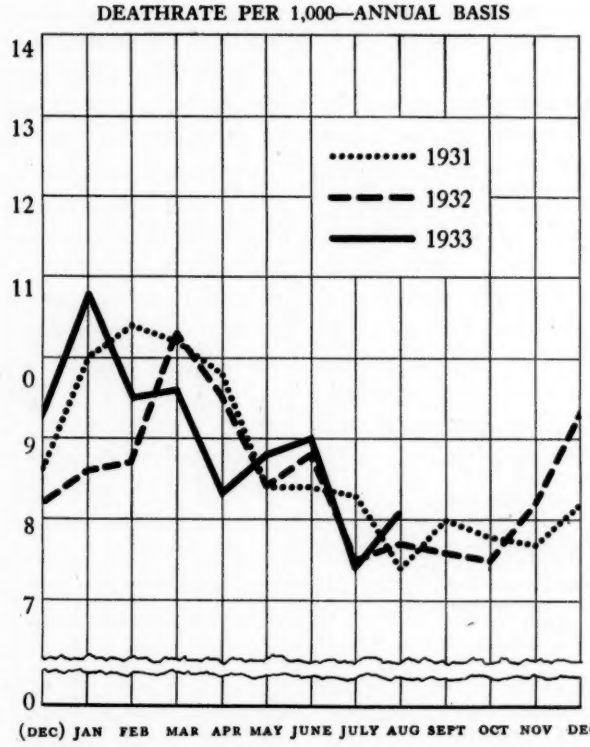
DEATHRATES FROM ALL CAUSES

in the Metropolitan Life Insurance Company
Industrial Department



1931	10.0	10.4	10.2	9.8	8.4	8.4	8.3	7.4	8.0	7.8	7.7	8.2
1932	8.6	8.7	10.3	9.5	8.4	8.8	7.5	7.7	7.6	7.5	8.2	9.3
1933*	10.8	9.5	9.6	8.3	8.8	9.0	7.4	8.1				

**Rates for 1933 are provisional.*

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